INSTREAM FLOWS IN WASHINGTON
PAST, PRESENT AND FUTURE

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INSTREAM FLOWS IN WASHINGTON STATE OF WASHINGTON
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INTRODUCTION –PURPOSE AND DEFINITION

Purpose

This paper is designed for use in electronic format. Much supporting documentation is omitted because links are included to those supporting documents.

The purpose of this paper is to describe how flows are defined and established in the state of Washington. This paper outlines how instream flows have been established in past years within the state, and describes new issues related to planning and management of flows.

The paper is intended to offer assistance for watershed planning, particularly to watershed planning units formed under the Watershed Planning Act (Chapter 90.82 Revised Code of Washington [RCW]) in their efforts to address stream flows. Under the Act, all planning units must include strategies for ensuring sufficient water to meet instream flows in their final watershed plan. Some planning units have also elected to set or revise instream flows. This paper describes background policies and options for use by the planning units in determining how stream flows will be addressed in their plan.

Audience

The primary audience for this paper is watershed planning groups. These include Ecology's "focus" watersheds (Skagit, Methow, Dungeness) and the watershed planning efforts occurring under Chapter 90.82 RCW. Other planning groups, legislators, federal agencies, governmental cabinet groups, water managers and many more also may find the information useful, but the target audience is watershed planning groups because of their immediate need for historical perspective, information, methods and approaches.

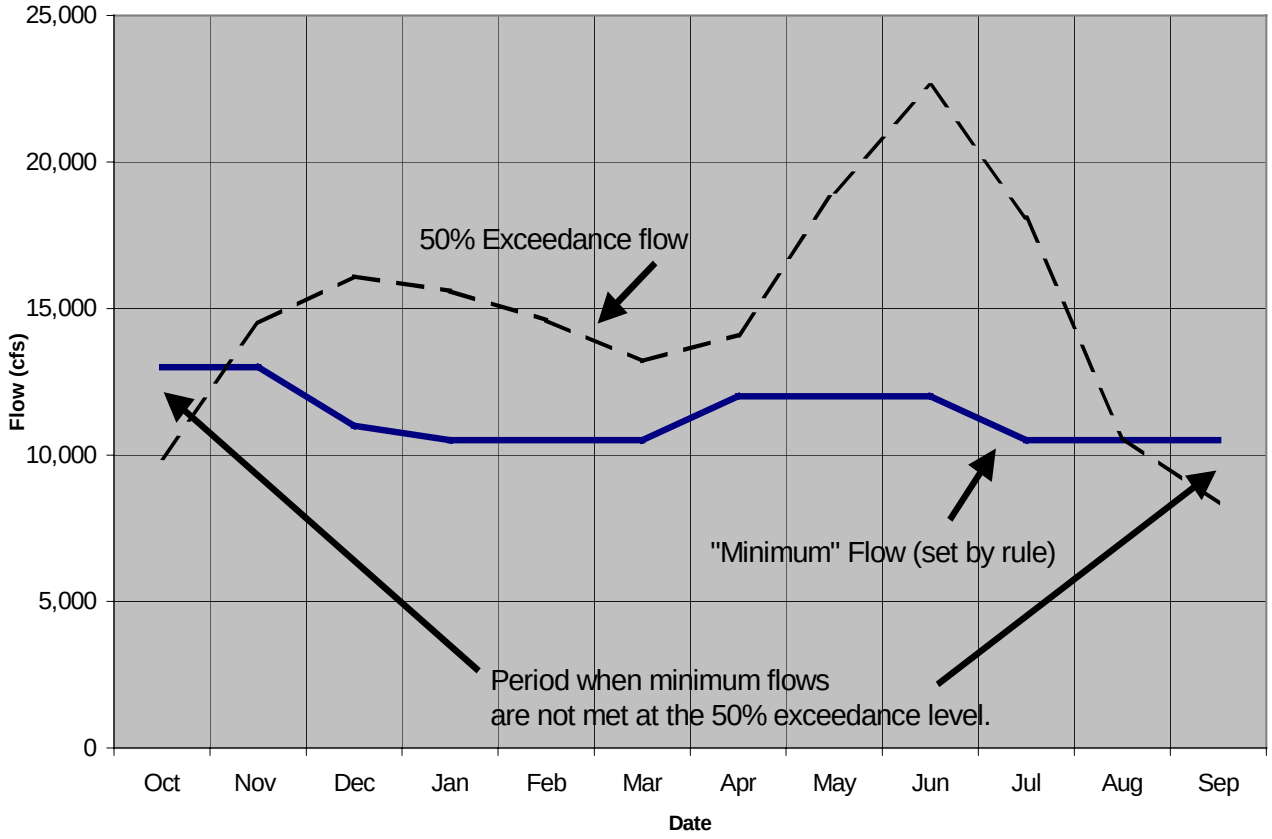
Definitions

A glossary of key terms, phrases, and acronyms is in the appendix on page 28.
For the purposes of this paper, the term "stream flow" refers to the quantity of water flowing in a stream or river and is typically expressed as a rate of flow (*e.g.*, cubic feet per second or second-feet) but does not guarantee the flow will always occur. The stream flow can be measured in a river at any given time.

The term "instream flow" refers to a specific stream flow that is identified for purposes of planning or management of a stream or river. The instream flow is usually defined as a stream flow that is adequate to meet specific needs or management objectives for the river. Instream flows are usually established in legal form, typically through adoption of a state rule. And they are usually defined as a minimum stream flow – *i.e.*, the instream flow for a river is met if the stream flow is at or above the flow rate specified by the instream flow. Such flows, once set by rule, are a water right under the law and are a limitation on subsequently issued water rights. (See Figure 1)

Ecology has traditionally not set flows at a level higher than the 50% exceedance flow. Figure one illustrates the hypothetical relationship between a flow set by rule and flows that might actually be in the stream. In the case of a stream like figure one, Ecology would probably have closed the stream to further appropriations for the period when the flows would not be met in this case, at least half the time.

Figure 1 Compares established flows (minimum set by rule) with the 50% exceedance level in a hypothetical stream. 50% of the time, flows would be lower than the 50% exceedance level. Hydrograph shows from mid-August through early November the instream flow would not be met 5 of 10 years because there is not enough water.



An example of instream flows set by rule is in the Nooksack Basin, Water Resources Inventory Area 1, (Ch. 173-501 Washington Administrative Code [WAC]) which can be accessed via the website of the Code Reviser's Office <http://slc.leg.gov/wacbytitle.htm>.

WHY ARE FLOWS IMPORTANT?

Flows are important because water is important. Flows in a stream are a "zero sum game" – there is a finite amount of water available at any given moment and if it is being used for one thing; it generally cannot be used for another. Water is needed in streams to protect instream resources – including the preservation of wildlife, fish, scenic, aesthetic and other environmental values, stock watering and navigational values. Flows affect the health of aquatic systems and resources. Flowing

water transports food and young salmon. Fish feed on insects drifting in the current. If water is taken out of a stream for what is termed a "consumptive use" (such as for domestic water supply), it is not available for instream resources. Historically, water diversions were not conditioned with instream flows. Senior water rights, that is, water rights senior to an instream flow established by rule, substantially dewater some streams in Washington. Senior water rights are not subject to subsequently adopted instream flows.

Low summer flows can result in fewer fish. Flows can be a crucial determinant in the health of fish

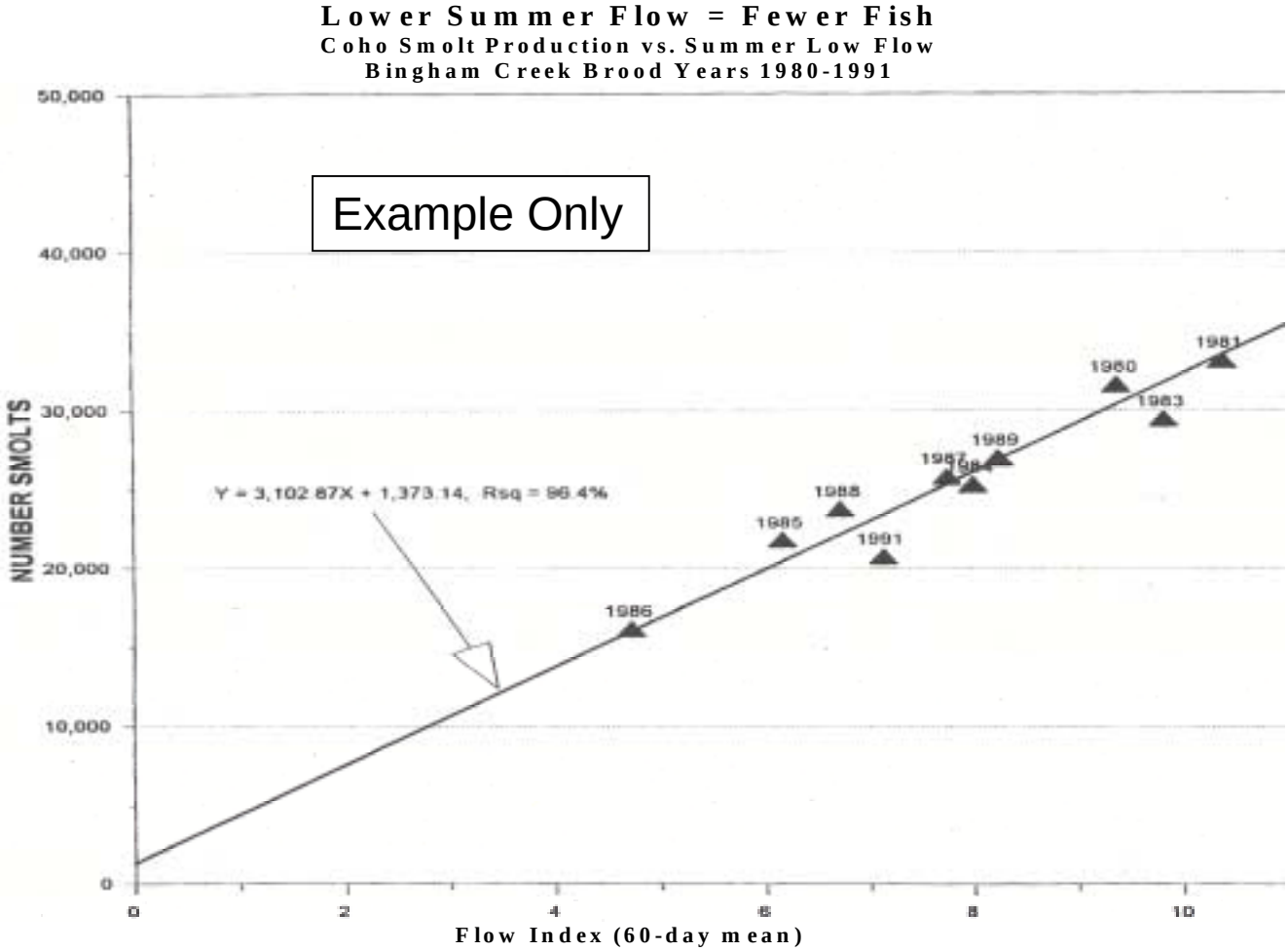


Figure 2 **Low flows generally equate to low fish production.** This example from Bingham Creek (Mason County tributary to the Satsop River) shows as flows increase, the number of smolts also increases.

stocks. As illustrated below, low summer flows can be strongly associated with fewer fish. An example of how this can happen is as follows: As flows subside during the summer, fish congregate in pools. Congregation can increase predation risk, competition for limited resources (*i.e*. food), or perhaps result in entrapment and stranding.

Flow levels can be a crucial determinant of the health of fish stocks and in the protection and restoration of fish stocks. Treaties and statutes, in state as well as federal laws, such as the Endangered Species Act (ESA) all have an influence on flows. Removing too much water **out-of-stream** can result in insufficient water for instream resources, including fish.

Stream flow is important to water quality. In Washington, more and faster flowing water generally means lower water temperatures (other factors are involved). Temperature is a water quality parameter regulated by the state Water Pollution Control Act (Ch. 90.48 RCW). Reduced flows can have an impact on concentrations of substances in the stream. Assuming the amount of the material remains the same, if the amount of water is reduced, the concentration (and often the toxicity) of the material in question is increased because a smaller amount of water is diluting the same amount of the substance of concern. Insufficient flow can contribute to violation of state water quality standards. Flows are considered in issuance of water quality permits.

Federal laws come into play with regard to flows through the Clean Water Act and the Endangered Species Act. Following are a couple of examples of how these two federal laws might be related to stream flow. The amount of flow affects water quality (regulated by the Clean Water Act) as a factor in the dilution capacity of a water body (as well as for things like temperature and dissolved oxygen, among other parameters). For ESA, clean water is needed to protect fish and so if the water is dirty, it can have a detrimental influence on listed fish species.

Flows can influence instream values besides fish and water quality. Many wildlife species are stream or riparian dependent so if flows are reduced, the associated riparian vegetation can be changed. If, for example, flows are greatly reduced, there will be a reduction in the amount of habitat for such species as the American dipper and kingfisher, which spend a great deal of time in and around streams.

Aesthetic and scenic values are influenced by the level of flow in a stream. The level of flow obviously influences how the stream looks. Less water in a stream generally exposes more of the streambed. Streambeds are oftentimes comprised of rocks and assorted woody debris, which many people find less inviting than a flowing, gurgling stream.

Navigation is affected by flows. High flows are needed for kayaking. If flows are too low, kayakers cannot use the stream for fear of damaging their craft on rocks that would not be a hazard if flows were higher. On a larger scale, in a river like the Columbia, if flows are below a certain level, the river becomes impassable to barges, tugs, and other watercraft because of the lack of draft. There might not be enough water to float the craft high enough to keep it from scraping the bottom of the river.

Demands on flows

Biological and economic systems put demands on flows. They each need water to “fuel” their vitality. If water availability falls below a certain point, the “system” becomes sick – whether it is lack of water for fish or for housing or an industry.

When flow levels are set in rule, the effective date of the rule becomes the priority date – as a water right. Water rights issued after the rule adoption are *junior* to the instream flow and cannot take water unless the flow set in the rule is being met. Setting flows may influence water availability for new uses. If a minimum flow is set in a stream, it may push the development of water supplies to other sources, such as wells.

When the state Water Code was passed in 1917 (Chapter 90.03 RCW), there were about 1.5 million people in the Washington. The Water Resources Act of 1971 (Chapter 90.54 RCW) saw the population at 3.5 million. Population in 2000 is 5.6 million and the state’s projected to have 7 million residents by 2010. Hand-in-glove with population growth is a rise in water demand for municipal and domestic uses and for commercial and industrial uses. An example: 8000 new, exempt wells are

drilled each year – this is water that could influence stream flows. A recent study has shown that on average 70% of flows in streams during summer comes from ground water. (*Estimated Baseflow Characteristics of Selected Washington Rivers and Streams*: 1999. Water Supply Bulletin No. 60; Department of Ecology. Publication number 99-327. Weblink: http://www.wa.gov/ecology/biblio/99327.html)

Tribes have rights to fish and also the right to habitat of sufficient quantity and quality to support fish. Generally, tribes are interested in having enough flow in streams to support harvestable numbers of fish. Tribes have the right to take fish in their "usual and accustomed" fishing places. In a water right context, court rulings have recognized a priority date for Indian instream flow rights associated with treaty fisheries of "time immemorial". Most rights of this nature have not been confirmed or quantified by adjudication, however, they likely represent a significant commitment of the water available in streams that support treaty fisheries.

When federal government land reservations were established, water explicitly or impliedly "reserved" in sufficient quantities and of a quality to support the primary purposes of the reservation. Examples of reserved areas would be Indian reservations, national forests, national parks, wildlife areas, military installations and reservations, and the like. In some areas, these reserved rights are a significant commitment of the available water. The priority date of a federal reserved right is generally the date on which the land reservation was enacted by Congress or established by executive order. For many Indian reservations in Washington, the priority date is in the 1850s.

Endangered and threatened listings of fish stocks under the Endangered Species Act lend an added urgency to providing flows for those fish that are at risk of extinction. As of April of 2000, there are 13 listed salmonid stocks in Washington under the Endangered Species Act. ESA listings can be linked to poor watershed health.

Based on the Governor's Salmon Strategy, *Extinction is Not an Option: A Statewide Strategy to Recover Salmon. (Sometimes called the Statewide Strategy to Recover Salmon or SSRS),*16 of the state's 62 Water Resource Inventory Areas (WRIAs) are classified as over-appropriated basins where stream flows are critical to salmonid recovery. Seven salmon recovery areas have been identified in the State Salmon Recovery Strategy, which cover most of the state. <http://www.governor.gov/esa/> A map depicting over-appropriated basins and the location of at-risk salmonids is in the appendix.

Figure 3
Over-Appropriated Basins Where Flow is Critical to Salmonid Recovery

WRIA 1 Nooksack
WRIA 7 Snohomish
WRIA 8 Cedar-Sammamish
WRIA 9 Duwamish—Green
WRIA 10 Puyallup—White
WRIA 12 Chambers-Clover
WRIA 17 Quilcene
WRIA 18 Elwha—Dungeness
WRIA 32 Walla Walla
WRIA 35 Middle Snake
WRIA 37 Lower Yakima
WRIA 38 Naches
WRIA 39 Upper Yakima
WRIA 45 Wenatchee
WRIA 48 Methow
WRIA 49 Okanogan

Source: *SSRS, 1999*

Federal agencies have also assessed the status of fish stocks in Washington and have determined that most of the state has fish that are in jeopardy. The

National Marine Fisheries Service (NMFS) website at http://www.nwr.noaa.gov/1salmon/salmesa/specprof.htm has ESA listing information for anadromous fish. The U.S. Fish and Wildlife Service (FWS) has ESA listing information on other species, including bull trout, at http://pacific.fws.gov.

AUTHORITY FOR SETTING FLOWS

Authority for setting flows is derived from state statutes. The primary statutes relating to flows and setting them are identified following. Rules and laws can be accessed through http://www.wa.gov/ecology/wr/rules/rul-home.html. Case law is not included in this paper but can be accessed at http://www.wa.gov/ecology/wr/caselaw/cl-home.html.

- *Water Code, Chapter 90.03 RCW*, (1917) in section 247 describes Ecology's exclusive authority for setting flows and describes conditioning permits to established flows.

- The Minimum *Water Flows and Levels Act* of 1967 (Ch. 90.22 RCW) set forth a process for protecting instream flows through adoption of rules. Among other provisions, it says Ecology must consult with the Department of Fish and Wildlife and conduct public hearings.

- The *Water Resources Act of 1971* (Ch. 90.54 RCW), particularly §020, includes language that says base flows are to be retained in streams except where there are "overriding considerations of the public interest". Further, waters of the state are to be protected and utilized for the greatest benefit to the people and that allocation of water will be generally based on the securing of "maximum net benefits" to the people of the state. This Act also authorizes Ecology to reserve waters for future beneficial uses.

- Chapter 75.20 RCW, *Construction Projects in State Waters*, (1949) requires Ecology to consult with the Department of Fish and Wildlife prior to Ecology making a decision on any water right application that may affect flows for food and game fish. Fish and Wildlife may recommend denial or conditioning of a water right permit.

- The *Watershed Planning Act* (Ch. 90.82 RCW) of 1998 in section 080 specifies that local watershed planning groups can recommend instream flows to Ecology for rule-making.

Rule making for flows is done through Ecology's rule-making authority in the Administrative Procedure Act (Ch. 34.05 RCW).

Federal agencies can be involved in setting flows. Flows can influence water quality (through temperature, dissolved oxygen, and other factors) and are thus related to the Clean Water Act. The Endangered Species Act requires protection for listed species. Water management (such as removing water from streams and thus reducing flows) could have a detrimental influence on listed fish.

Fish and factors affecting them are important to Tribal governments. Tribes have concern with flow levels.

HISTORY

The aforementioned statutes provide for the protection of flows from reduction by subsequent water rights. Case by case water right determinations were made in the 1950s and 1960s that established flow protection levels or denied further appropriation of water to protect flows. Following the 1967 and 1971 Acts until 1986, Ecology established instream flows in seventeen of the state's 62 WRIAs. Since 1985, there has been much controversy over what the level and priority of flows should be. Approaches ranged from Ecology assessing the resource and then establishing rules after comparatively little involvement from those residing within the watershed (as with the proposed Skokomish-Dosewallips rule) to consensus-based techniques (the *Chelan Agreement*). These approaches were all without the success of having set any additional flows. Groups ranging from stakeholders to legislators; proponents of instream use and proponents of out-of-stream use all have had concerns as to how the instream flow program should operate. The upshot of the various efforts has been no instream flows have been set by rule since the Nooksack regulation was adopted (Ch.173-501 WAC) on December 4, 1985.

The Skokomish-Dosewallips Instream Resources Protection Program (WRIA 16) was proposed in 1985. At that time, Ecology rules had to be reviewed by the Ecological Commission (now defunct). When Ecology proposed instream flows for this basin, the Commission did not endorse the recommended flows and no rule was adopted. The Commission said the flows were too low to adequately protect instream resources. Ecology re-examined alternative management approaches.

Due to increasing controversy, in 1986, Ecology initiated a full review of the instream flow program and in February of 1987 published the draft environmental impact statement entitled, *Instream Resources and Water Allocation Program Review*. Major changes in the program were proposed to increase the level of instream protection for most streams, and require mitigation by any new water developments that would diminish instream values.

This resulted in more controversy and prompted passage of a legislative bill in 1988 (Second Substitute Senate Bill 6724) establishing the Legislature's Joint Select Committee on Water Resource Policy to review the fundamental water resource policies of the state, particularly instream flows and water allocation. This legislative review was no more successful in ending the controversy than Ecology's previous effort.

In 1990, the executive and legislative branches, in cooperation with Indian tribal organizations initiated a mediated dispute resolution process to address instream flows and water allocation issues. The landmark *Chelan Agreement* of 1991 provided a framework for establishing instream flows and carrying out watershed planning. The Water Resources Forum, which was set up under the Chelan Agreement, developed policy approaches for instream flows and instream flow methodologies but their recommendations remained controversial and were not implemented. The Chelan Agreement established regional pilot water planning programs in the Methow (WRIA 48) and the Dungeness-Quilcene (parts of WRIAs 17 and 18) basins to test a consensus-based approach in local situations. The Regional Planning Guidelines developed by the Forum and the lessons learned formed a basis for later watershed planning legislation that resulted in the current watershed planning programs in Ch. 90.82 RCW.

In 1998, the legislature passed Engrossed Substitute House Bill 2514 which was codified as Watershed Planning, Chapter 90.82 RCW. This chapter provides an avenue for local citizens and various levels off governments to be involved in collaborative water management, including the option of establishing or amending instream flows.

Figure 4: URLs for Major Laws, Regulations and Court Cases relating to stream flows

Washington Water Laws (RCWs)	http://www.wa.gov/ecology/wr/rules/laws-wr.html
Washington Regulations (WACs)	http://www.wa.gov/ecology/wr/rules/rules-wr.html
WA Water-related Case Law	http://www.wa.gov/ecology/wr/caselaw/cl-home.html

In essence, the state legislature has given Ecology the authority to set flows in streams after going through public processes to ensure all issues are identified and considered in the establishment of flows by rule.

STATUS OF FLOWS

Under the Water Resources Act of 1971 (Ch. 90.54 RCW) and its concomitant administrative code (Ch. 173-500 WAC, Water Resources Management Program Established Pursuant to the Water resources Act of 1971), Ecology divided the state into 62 Water Resources Inventory Areas (WRIAs). Based generally on hydrogeographic boundaries, these WRIAs (pronounced “Y-rahs”) are the planning and management units for water.

Figure 5: Water Resources Inventory Areas (WRIAs) – Names and Locations

Figure 6 WRIAs with Instream Flows &/or Closure Set by Regulation	
WRIA 1 Nooksack	WRIA 15 Kitsap
WRIA 7 Snohomish	WRIA 22 Lower Chehalis
WRIA 8 Cedar-Sammamish	WRIA 23 Upper Chehalis
WRIA 9 Duwamish—Green	WRIA 45 Wenatchee
WRIA 10 Puyallup—White	WRIA 48 Methow
WRIA 11 Nisqually	WRIA 49 Okanogan
WRIA 12 Chambers-Clover	WRIA 55 Little Spokane
WRIA 13 Deschutes	WRIA 59 Colville
WRIA 14 Kennedy-Goldsborough	**See map in appendix**.

Nineteen Basin Plans or Instream Resources Protection Programs (IRPPs) have been adopted in Washington affecting 19 Water Resources Inventory Areas, the Columbia and the Snake, as well as parts of four other WRIAs.

Some sort of restriction or closure regarding flow is in regulations for 17 WRIAs. This means water rights issued subsequent to the adoption of the instream flows are supposed to be abated when the minimum flows in the regulations are not being met. Generally, the flows in the regulations have volume (in cubic feet per second) and/or timing constraints (such as being closed during low flow periods) measured at a flow gage or gages somewhere along the stream. These parameters and any other limitations are spelled-out in the regulations. For an example of flows set in a regulation, examine *Chapter 173-513 WAC, Instream Resources Protection Program – Deschutes River Basin, Water Resource Inventory Area (WRIA) 13*. Section 030 of this WAC lists the gages at which the flows are measured, the flow amounts and the times the specified flow must be in the stream. (Link: Ch. 173–513 WAC)

Flow management was approached through two planning tools, both derived from Chapter 173–500 WAC, the Water Resources Management Program, which was established in response to the Water Resources Act of 1971. Regulations were proposed in all these planning programs.

The first tool was the "basin plan" approach. Basin plans attempted a comprehensive view of water resources management within the basin. They included more things than flows. Generally covering only one WRIA each, a basin plan was developed for the Snake River, for the John Day-McNary Pool (parts of WRIA 32, 33, 36, and 37), and for nine other WRIAs.

The second approach, the Instream Resources Protection Program or IRPPs, focused on setting flows and tended to be in Puget Sound, although IRPPs were also completed for the Columbia and Wenatchee Rivers.

Figure 7
Adopted Basin Plans and Instream Resources Protection Programs

WRIA	Name	WAC Citation	Date filed
WRIA 1	Instream Resources Protection Program **Nooksack** River Basin	Ch. 173–501 WAC	12/4/85
WRIA 7	Instream Resources Protection Program **Snohomish** River basin	Ch. 173–507 WAC	9/6/79
WRIA 8	Instream Resources Protection Program **Cedar–Sammamish** basin	Ch. 173–508 WAC	9/6/79
WRIA 9	Instream Resources Protection Program **Green–Duwamish** River basin	Ch. 173–509 WAC	6/6/80
WRIA 10	Instream Resources Protection Program **Puyallup** River basin	Ch. 173–510 WAC	3/21/80
WRIA 11	Instream Resources Protection Program **Nisqually** River basin	Ch. 173–511 WAC	2/2/81
WRIA 12	Instream Resources Protection Program **Chambers–Clover** Creek basin	Ch. 173–512 WAC	12/12/79
WRIA 13	Instream Resources Protection Program **Deschutes** River basin	Ch. 173–513 WAC	6/24/80
WRIA 14	Instream Resources Protection Program **Kennedy** — **Goldsborough** basin	Ch. 173–514 WAC	1/23/84
WRIA 15	Instream Resources Protection Program **Kitsap**	Ch. 173–515 WAC	7/24/81
WRIA 22 and 23	Water Resources Program **Chehalis** River basin	Ch. 173–522 WAC	3/10/76
WRIA 31 and parts of 32, 33, 36, 37	Water Resources Program for **John Day–McNary** Pools reach of the Columbia River	Ch. 173–531A WAC	6/24/80
WRIA 32	Water Resources Program in the **Walla Walla** River basin	Ch. 173–532 WAC	12/14/77
WRIA 45	Instream Resources Protection Program **Wenatchee** River basin	Ch. 173–545 WAC	6/3/83
WRIA 48	Water Resources Program in the **Methow** River basin	Ch. 173–548 WAC	12/28/76
WRIA 49	Water Resources Program in the **Okanogan** River basin	Ch. 173–549 WAC	7/14/76

WRIA 55	Water Resources Program in the **Little Spokane** River basin	Ch. 173–555 WAC	1/6/76
WRIA 59	Water Resources Program in the **Colville** River basin	Ch. 173–559 WAC	7/22/77
	Instream Resources Protection Program for the main stem of the **Columbia River** in Washington State	Ch. 173–563 WAC	6/24/80
	Water Resources Management Program for the main stem of the **Snake River** in Washington State	Ch. 173–564 WAC	1/3/93

Instream flows may also be associated with other actions or projects. Hydropower licenses issued by the Federal Energy Regulatory Commission (FERC) may require certain minimum flows be left in a by-pass reach in sufficient quantities to satisfy fish and other instream flow needs. Typically, those flows would be a condition of the FERC license, but may also be required under a state water right and/or a water quality certification issued by the state (Ecology).

Instream flows can be a condition on a new water right in a watershed even where flows have not been adopted by rule. Ecology must solicit comments from the Department of Fish and Wildlife regarding any water right application that may affect food or game fish. Based on DFW comments, Ecology may deny the application or may condition the permit, if issued, with instream flows.

Process for Setting Flows by Rule

In the 1970s and '80s when Ecology was actively establishing stream flows by rule, the process can be generally summarized as technical studies followed by policy negotiations, public process, and then rule adoption. A determination of the flows levels needed for instream resources protection was generally determined based on technical studies. Most of the time the studies focused on fish needs, the assumption being in most cases if fish needs are met, the needs for other instream uses would also be met. (An obvious contradiction to this assumption is for recreation such as kayaking; higher flows may be required than are recommended for fish). The Instream Flow Incremental Methodology (IFIM) PHABSIM (**P**hysical **Hab**itat **Sim**ulation system) became and remains the accepted method for most fish-flow studies in the Pacific Northwest. On smaller streams, the so-called "toe-width" method was used to analyze fish habitat flow needs. *(Descriptions of IFIM and toe-width methods are in the appendix.)*

The natural and modified (by human activities) flow characteristics were also typically evaluated. The various interested parties, especially Tribes and the agencies with jurisdiction for fish and other instream resources would meet, usually over the course of several months, and negotiate flow level recommendations. The recommendation usually carried considerable weight in that most of the involved players helped develop the recommendations, supported the recommendation, or at least provided a minority opinion. Ecology then followed rule making procedures specified in the Administrative Procedure Act (and other laws) to propose and eventually adopt the flow protection measures as rules. These procedures typically included public involvement through workshops and advisory committees, and, always, public hearings.

Priorities for addressing stream flow issues

Addressing the flow needs of salmonids listed under the ESA is an obvious priority. Ecology is focusing resources in the Methow, Skagit and Dungeness Rivers. Progress is being made in developing a flow management proposal for each basin, but no rules have yet been adopted (as of May, 2000). Ecology is also concentrating in areas identified in the Governor's Statewide Strategy to Recover Salmon and also supporting watershed planning units under Ch. 90.82 RCW. In those

Figure 8 **Watershed Planning Areas** **Intending to Address Flows** May 2000
WRIA 1 Nooksack
WRIA 3 Lower Skagit
WRIA 6 Island
WRIA 8 Cedar-Sammamish
WRIA 9 Duwamish-Green
WRIA 13 Deschutes
WRIA 15 Kitsap
WRIA 18 Elwha-Dungeness
WRIA 19/20 Lyre-Soleduck
WRIA 29 Wind-White Salmon
WRIA 30 Klickitat
WRIA 46 Entiat
WRIA 48 Methow
WRIA 56 Hangman Creek
WRIA 59 Colville
All but WRIAs 8 and 9 are Ch. 90.82 RCW planning areas. Some are early in the process and may later determine not to address flows. Other WRIAs may later decide to address flows.

watersheds without adopted instream flows, watershed planning groups can elect not to recommend flows, thus obliging Ecology to set those flows in order to complete the watershed plan. A map showing watershed planning areas (under Ch. 90.82 RCW, the Watershed Planning Act) and those which have opted to address flows is in the appendix.

OBLIGATIONS AND OPTIONS FOR INSTREAM FLOWS

The Water Resources Act of 1971 (Ch. 90.54 RCW) declares the general fundamentals for utilization and management of waters of the state. In addition to the environmental protection measures described previously, §020 includes provision regarding "maximum net benefits" and " overriding considerations of the public interest".

In subsection (2) of §020, the "Allocation of waters among potential uses and users shall be based generally on the securing of the maximum net benefits for the people of the state. Maximum net benefits shall constitute total benefits less costs including opportunities lost." Case law says Ecology does not have to weigh instream versus offstream uses. Instream flows are a *defacto* higher priority than future offstream use given the language of the statute.

Subsection (3)(b) of §020 says, in essence, that waters of the state cannot be degraded "except in those situations where it is clear that overriding considerations of the public interest will be served". This statement would allow an offstream use to be permitted without regard to established instream flows under exceptional circumstances.

Watershed Planning Units (WPUs) obligations regarding flows are detailed in Chapter 90.82 RCW, particularly section 080. WPUs have the *option* of recommending flows to Ecology. If the WPU chooses not to address flows or, if the WPU cannot come to a unanimous recommendation on flows, then Ecology may initiate rule making for setting flows that would complete the watershed plan.

The watershed law addresses several planning scenarios. If the local governments and Tribes in the WPU were not unanimous in their recommendation to modify an existing instream flow, there would not be a modification of that flow. In planning areas where there is no instream flow rule, determination of recommended flows would be a collaborative effort between the WPU and Ecology. Instream flow recommendations must have unanimous support of all government members and Tribes and a majority on non-government members.

If there is no Watershed Planning Unit approval of flow recommendations within four years of when funds were first received (under RCW 90.82.040), Ecology may initiate rule making and has two years to set flows for those streams for which approval is not achieved.

Section 070 of Chapter 90.82 RCW directs WPUs to assess current water use (which presumably would include flow needs) and develop strategies to meet identified future needs. Assessing flows needed in the watershed's streams and then recommending strategies as to how to protect and/or restore those flows is, in essence, setting instream flows. The WPU recommends flows to Ecology, which is to adopt them into rules under its rule-making authority.

The process for what to do *after* a WPU determines what they believe the flow should be is described in the Watershed Planning Act, RCW 90.82.080. The specific process for how to arrive at a flow recommendation is not prescribed by law.

Watershed Planning Groups Recommending Flows

There are several assumptions underlying the submittal by a watershed planning group of flow recommendations to be made into rules. One is that Ecology and other agencies need to be actively engaged in the development of flow recommendations. Several agencies may have a role (*e.g*. Department of Fisheries and Wildlife has responsibilities for fish which are influenced by flows) and Ecology has the responsibility for rule development, so its concurrence with the flow levels and the process is crucial. Under the watershed planning law, a planning unit cannot commit an agency to do something with which it has not concurred. Consequently, it is essential that Ecology and the Department of Fish and Wildlife be fully involved in planning unit discussions and decisions on instream flows because both those agencies have responsibilities regarding flows. Belatedly raising issues or opposition to WPU recommended flows would be deservedly criticized by the WPU and the public. Resource agency advice will be given substantial weight for any state commitments to the watershed plan and during rule making (this could include the state Departments of Fish and Wildlife and Health, as well as federal agencies, such as the Environmental Protection Agency (EPA), NMFS, FWS, FERC and possibly others). (See Watershed Planning, Ch. 90.82.130(3) RCW)

Appropriate flow analysis and modeling methodologies will need to be employed. Generally, the Instream Flow Incremental Methodology (IFIM) is recognized as the state-of-the-art method for modeling fish habitat flow needs, particularly for larger streams. IFIM is a process for evaluating instream flows in the context of the entire ecology of the watershed, including hydrology, geography, and biology. PHABSIM is a modeling approach and is a tool for use within (or separate from) IFIM. For smaller streams, the toe-width method can be used if Ecology and DFW concur. Methodologies for streams within a watershed are a point of negotiation the WPU needs to work through as they develop their flow recommendations. Generally, IFIM is data-intensive and therefore relatively expensive. Toe-width, by contrast, is much less data and time consuming. Both methods require the taking of field measurements during the spring and summer, so timing can be critical. (A brief summary of IFIM and toe-width methods, along with their usual applications, is included in the appendix. See also Appendix B for a list of websites.)

Flow analysis methods for values other than fish would also need up-front agreement. The flow setting process varies from stream to stream. There are, however, some common elements when flows are recommended. Flow needs are identified by an appropriate representation of water users and interested parties, analytical methods are agreed to and data are gathered. Scientists analyze the data and come to an agreement on the flows needed for the various species and life stages of fish (and/or other uses, if they are being analyzed) and make a recommendation to the decision-makers.

When Ecology proposes a rule, including instream flow rules negotiated by a WPU or other local body, it is obligated to follow the Administrative Procedure Act (Ch. 34.05 RCW). (Link to Code

Reviser's Office listing RCWs - http://slc.leg.wa.gov/). The APA specifies public hearings. If the watershed planning effort is sufficiently broad, it should capture most all the views in its flow deliberations. However, during the required public hearing(s), information may be brought forth that was not considered during the development of the flow recommendation on which Ecology was to base its rule. Should this happen, Ecology will consult with the watershed planning group prior to taking final action on the rule proposal.

FACTORS TO CONSIDER WHEN ADDRESSING FLOWS

Climate

Climate is a major factor affecting stream hydrology, including flows; particularly precipitation as either rain or snow. The amount and timing of precipitation, and factors related to climate such as vegetative cover and impermeable surfaces, soil and geological conditions, altitude, slope, aspect, and other factors influence flows. Some streams are "flashy" in that they react quickly to rainfall – the rainfall quickly enters the stream and is converted to flow. During the rainy season, flows generally increase (other factors being equal). During hot, dry periods, flows tend to decline to levels at which much of the flow may be the result of ground water discharging into the stream channel.

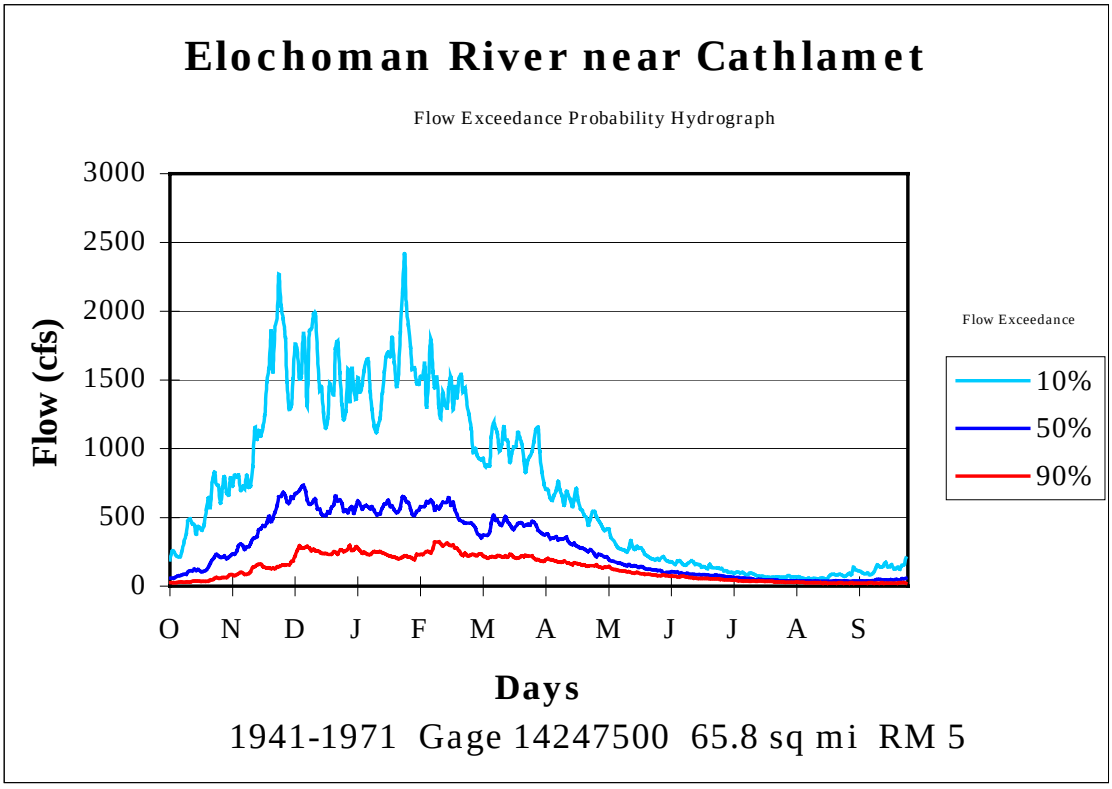


Figure 9: Elochoman River – An Example of a Rain Influenced Stream

The Elochoman River (Figure 9) is an example of a rain-driven system in that the period of relatively high flows is the same as the period of the most rainfall. Lots of rain in the winter yields lots of flow during the winter. Little rain falls during the summer months resulting in very low natural flows.

Snow also influences flow. Lowland snow can cause rapid increases in flow if a warm rain falls on it and causes it to melt; the so –called "rain-on-snow events". At higher elevations, snow melt provides a gradual release of water into streams during the spring as temperatures increase and as the snow melts. Typical of many places in Eastern Washington, flows often peak in late spring and early summer as the warmer temperatures cause melting. Climatic information can be obtained from sources such as a local weather station, airports, USDA Forest Service; the state Department of Natural Resources (DNR), or the National Weather Service. Many sites are available on the web.

The Methow River (Figure 10) is an example of a snowmelt stream. The period of higher flows corresponds to when temperatures start to increase and snow starts to melt; *i.e.* in late spring and early summer. Cold weather during winter months keeps available moisture locked up as snow and ice; causing low flows.

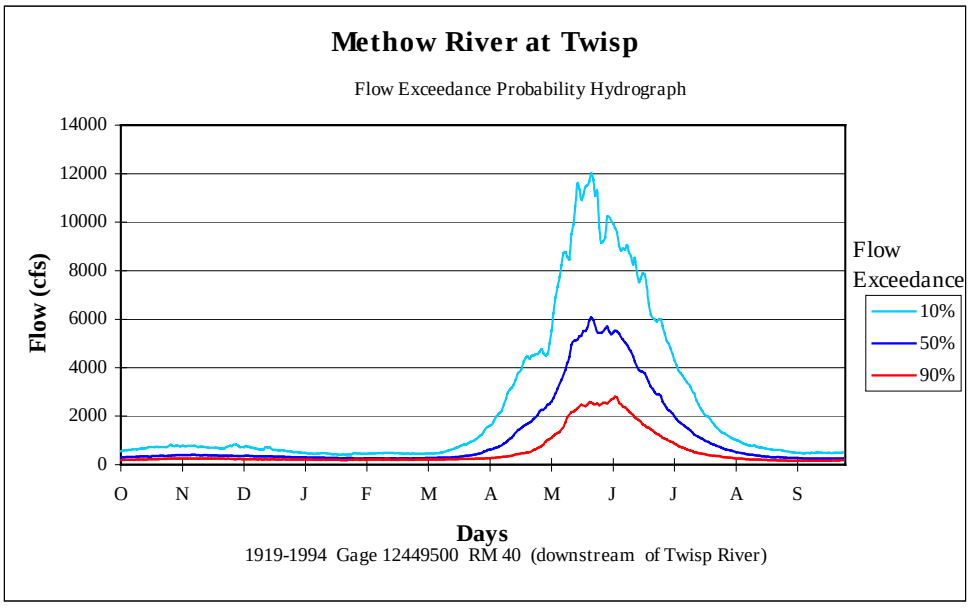


Figure 10: Methow River – An Example of a Snow-Melt Influenced Stream

Drought patterns, El Niño, and La Niña all play a part in flows. Storm events can cause flooding; *i.e.* very high flow. Local flood management agencies and Ecology can provide information on flooding.

Land Use

Sidebar 1

Estimated Baseflow Characteristics of Selected Washington Rivers and Streams: Water Supply Bulletin No. 60. October 1999.

ABSTRACT

Automated hydrograph separation techniques were used to evaluate the groundwater contribution to total streamflow (baseflow) at active and inactive stream gaging stations throughout Washington State. Discharge records for 582 gaging stations, with at least three complete water years of daily mean streamflow data, were downloaded from the U.S. Geological Survey (USGS) National Water Information System. Station characteristics were compiled for each gage, including period of streamflow record, type and degree of regulation affecting the gage, watershed drainage area, USGS station number, station name, and gage location.

Summary statistics were calculated for annual mean streamflow and annual 7-day low flow for all 582 stations. Monthly, and in some cases annual, statistics for baseflow were then estimated using a USGS hydrograph separation software program called HYSEP (Sloto and Crouse, 1996) for those stations judged to be free of significant snowmelt or regulation effects.

Annual unit-area baseflow for the 294 stations free of significant regulation or snowmelt effects ranged from <1 to 11 ft3/sec/mi2 with a median value of 2.9 ft3/sec/mi2. Unit-area baseflow for stations located west of the Cascade Mountain crest averaged approximately 3.2 ft3/sec/mi2. Stations located east of the crest averaged approximately 0.4 ft3/sec/mi2. On average, groundwater discharge represented approximately 68% of total annual streamflow for the stations modeled. Estimated groundwater contributions to streamflow for the typical low flow months of July, August, September, and October averaged 86%, 86%, 77%, and 69% respectively. This suggests that reductions in groundwater discharge to streams during this period, due to increased groundwater withdrawals, may significantly impact the instream flows needed to sustain fish and maintain water quality. This highlights the importance of managing surface water and groundwater as a single interconnected resource.

The baseflow estimates provided in this report are best used as basin-scale averages. Any attempt to apply these values as absolute representations of groundwater inflow on either a basin scale or stream segment scale is inappropriate.

There is a relationship between flows and vegetative cover. As land is developed and the amount of impervious surface is increased, streams tend to be “flashier” – the water gets into the streams faster and the time between when the rain falls and when it is in the stream is generally shorter. Water does not penetrate impervious surfaces. Impervious surfaces are things like streets, parking lots, and roofs of buildings. Natural vegetative cover tends to “hold” moisture encouraging infiltration into the ground and releases water more slowly than do impervious surfaces. Vegetation also assists in maintaining water quality by “filtering” sediments. Water directed off-site by pipes or ditches also is not available for groundwater recharge. (Stormwater run-off, particularly from streets laced with petroleum originating from motor vehicles, is a water quality concern that is being elevated.) County and city planning offices are good sources of land use information and the Natural Resources Conservation Service maintains data on rural land uses.)

Ground Water

An October, 1999 study (*Estimated Baseflow Characteristics of Selected Washington Rivers and Streams)* (Weblink - http://www.wa.gov/ecology/biblio/99327.html) showed that in the dry season, on a state-wide basis, an average of 70% of streamflow originates from groundwater. Sometimes called, “base-flow”, this groundwater inflow has a significant effect on stream flow. Besides contributing volume to the surface water flow, it generally tends to be colder than surface water, so when it mixes with the surface water it has a cooling effect that is generally beneficial for water quality and salmonids.

Water Use

Water withdrawn from a stream or from a well that is in hydraulic continuity with the stream will not be available for flow in the stream. The effect of withdrawals can have a large effect on small streams where the percentage of water withdrawn may be high compared to the water in the

stream. Figure 11 shows the effect of withdrawals on a small creek – in this case Upper Crab Creek in Lincoln County (WA). It depicts the relationships between surface water withdrawals (SW Qa), ground water withdrawals (GW Qa), and a 7-Day low flow. The hydrograph shows that during certain times (*e.g.* 1988 and 1989) the remaining flow is lower than the amount of water withdrawn.

Water use patterns and projected future growth play a role in assessing stream flows. Projected future growth includes land use conversions (*e.g.* from forests to development), changes in the amount of impervious surfaces, projected timber harvest, water storage and amounts used; seasonality of use, diversions (ground water withdrawals would also affect flows, depending on the degree of hydraulic continuity, etc.). The planning group should look at long range plans and ascertain if there are major water-using projects being proposed. (Examples would be hydropower projects, golf courses, baseball stadiums, municipal supplies, new industries, fruit packers, or any other process or use that is water-based.) In addition, an assessment of how land use alteration may affect future hydrology may provide insight to the flow determination process.

In other cases, the amount withdrawn may have a small effect on a larger river. (Figure 12 shows the effect of withdrawals measured at the Dalles on the Columbia River is small when compared to the overall flow of the river.) Stream flow can be obtained from the U.S. Geological Survey (see website listing in appendix.), or the state Department of Ecology (from the regional offices), as well as other sources. Withdrawal information (both surface and ground water) can be obtained from the Department of Ecology regional offices.

Figure 11: Crab Creek - Example of Stream Where Surface and Ground Water Withdrawals Exceed the Flow

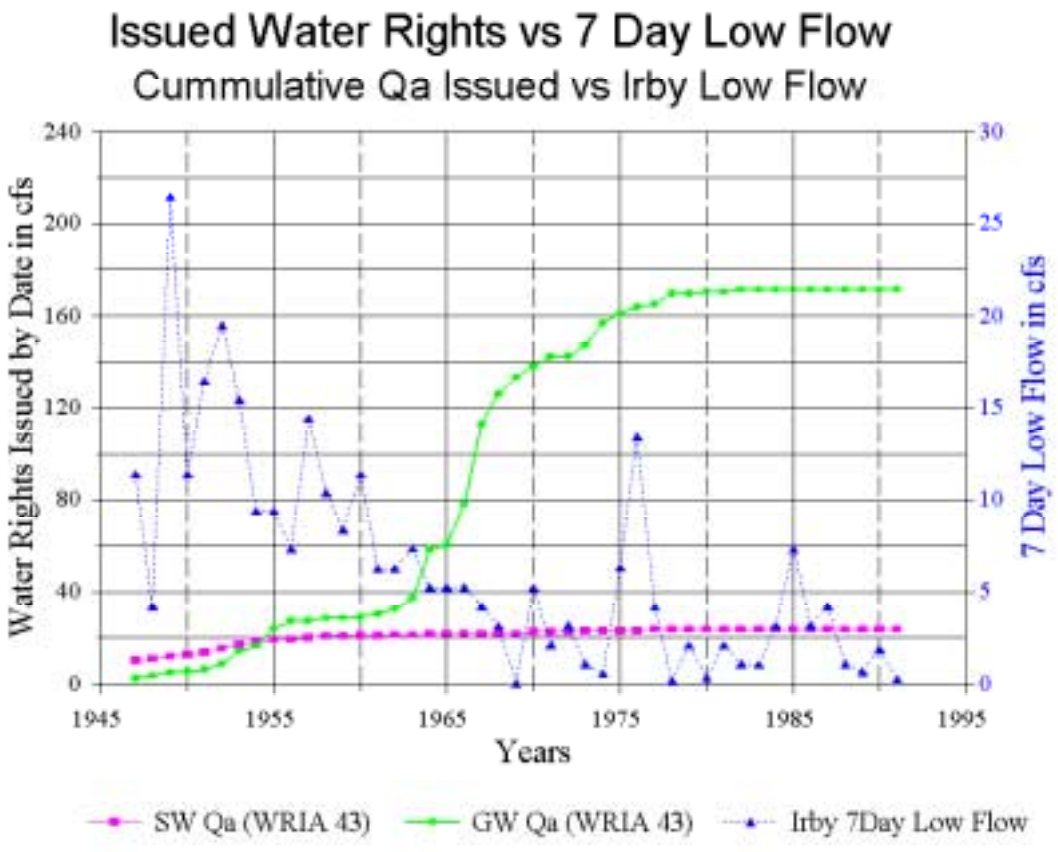
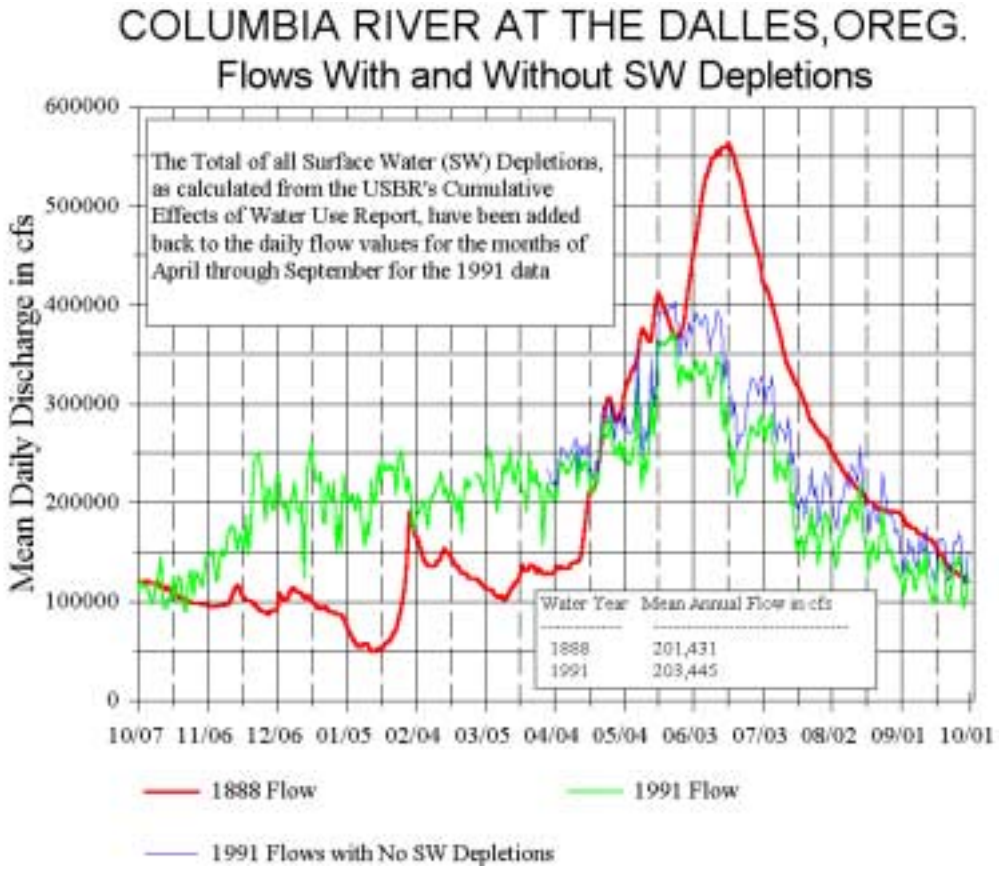


Figure 12 shows that withdrawals have had scant effect on the total water in the Columbia River. Mean annual flow in 1888 is slightly over 99% of the mean annual flows in 1991 - that is, they are essentially equal after all the withdrawals between 1888 and 1991. Note the "flattening" of the hydrograph – the peaks are not as high in 1991 nor are the valleys as low because today the water is stored behind dams during high flow season and released to augment the river flow during low flow season.

Water diverted or withdrawn can re-renter the hydrologic system downstream from the withdrawal or diversion point. For example, water may be withdrawn for domestic use. After being used in the house, it goes into the septic system and then filters through the ground back into the groundwater, where it then could contribute to base flow in a stream.

Figure 12: Example of How Withdrawals May Have a Small Effect on a Large River System. Note the flattening of the hydrograph.



Dams

Dams affect flows. There are exceptions to the following generalizations. Run-of-the-river facilities basically have the water run through them and have little or no storage capacity. Facilities with storage can control the rate and timing of water released downstream in relation to their size. Dams tend to make for less variation in flows – they diminish the peaks and heighten valleys on a hydrograph. Rate of flow can vary from hour to hour, depending on the facility. Usually, irrigation storage projects try to store spring run-off and then release it for the summer irrigation season and gradually draw down the water in their reservoirs at a rate that will last the entire irrigation season. Power dams store spring high flows and hold the water until the following winter when power demands are highest (in the Pacific Northwest). Flood control dams briefly capture high flows, then quickly release the water at a safe rate to prepare for the next flood event. Some dams may also store water to augment instream flows during the summer and fall period. Bigger reservoirs can let out more water over a longer period than can a smaller reservoir, other things being equal. Dams can act as sediment traps (trapping sediments behind them) or as barriers to fish passage. Because water in a reservoir is slow-moving, sediment tends to "settle out". In a free-flowing river, the sediment would be transported downstream. Information concerning dams in Washington can be obtained from Ecology's Regional Offices or Ecology's Dam Safety Section.

The Federal Energy Regulatory Commission (FERC) licenses hydropower facilities. Oftentimes flows are set as part of a facility's operating license. Ecology can provide information on these facilities within Washington.

Storage

Storage of water can affect flows. Water storage facilities are those where a structure (like a dam) is placed in a stream and can control the volume and timing of flow. Water may also be stored in an off-stream reservoir; that is, a reservoir away from the stream course. Water is stored in a reservoir during high flows and then released at times needed to meet the purposes for which the reservoir was built. Usually, water supply reservoirs are filled in the spring and then stored water is gradually released starting in mid-summer to be diverted for various uses. Late summer is generally a time of lower rainfall and lower flows and water released can be used for things such as irrigation for crops. The hydrologic effect is that below the storage facility, the flow does not vary as much as it would naturally between times of high and low flows (The hydrograph would be "flattened" from natural conditions and look much like the 1991 flow depicted, above, in figure 12.)

Artificial recharge, injecting water into the ground is another approach to storing water for future use. This amounts to using the water holding capacity of the ground as a reservoir. During times when there is excess surface water, it is injected into the ground to be pumped later when it is needed. This pumped water could be put into a stream to increase surface water flow and is called flow augmentation.

Future Management

A function of the watershed planning units is to assess current water use and plan strategies for the future. The above factors affecting flow give a snapshot of existing conditions. How flows will be influenced in the future depends on the future being pursued. Planning groups need to look at trade-offs and compromises in their strategies. More development would portend more impervious surfaces, which would result in flashier stream systems. Water retained in the stream could not satisfy out-of-stream uses. A dam might give predictability to flow levels, but would have to address fish passage, as well as a plethora of other related issues (such as nitrogen gas problems, elevated temperatures, fish losing their way during out-migration because they cannot tell which way the water is flowing, increased incidence of disease and stress because the fish "bunch-up" at ladders, etc.). Water withdrawals would reduce the amount of water left for the stream and associated resources.

Other factors

Many factors affecting flow are based on economic and community needs.

Fish and wildlife and their habitat based on flows need to be protected. In state law, RCW 90.22.010 provides that the Department of Fish and Wildlife can request Ecology to establish flows for the purposes of protecting fish, game, birds or other wildlife resources, or recreational or aesthetic values of said public waters whenever it appears to be in the public interest to do so. Traditionally, Ecology has treated requests from Tribal governments in the same way.

In a flow management framework an issue is inchoate rights (unperfected water rights), or other rights that are not in use to the full amount specified. A water right specifies a specific amount of water, where the water will come from, how and where it will be used, and the conditions of use. Sometimes the water right is not "fully exercised". The water right might be for two cubic feet per second (cfs) of flow, but the person may only be using one cfs. Many times the amount of water permitted to be used and the actual use is unknown. This leads to some subjectivity in predicting future water use since the amount *currently* in use is not precisely known. "Paper water rights" may be useful to assess, but normally do not reflect actual use, which tends to be less. In the above example, the "paper right" is for two cfs, but the actual use is only for one cfs.

Local water management can affect flows. The number and size of withdrawals, their timing and point of diversion can all affect flow levels. There are more subtle things that may influence future flow conditions such as unperfected water rights, under-utilized water rights; and municipal water right reservations.

Other planning efforts may be taking place concurrently with a formal watershed planning effort. Watershed analysis is a forestry tool for assessing management influences within a watershed. Different versions of watershed analysis are used by the USDA Forest Service and the Department of Natural Resources to examine some aspects of water management, including stream morphology and hydrology, erosion, fish needs, and water quality. Contact your local Forest Service or DNR office regarding watershed analyses in your area.

Larger and growing water utilities are required to prepare and periodically update water supply plans. Such plans can give a good indication of projected water demand and conservation strategies. The state Department of Health is a good source of information for these plans.

Counties and cities develop growth management and land use plans. Such plans are increasingly linked to the natural resource base (including water) available to support growth and more intensive land use. City, county, and regional planning agencies are the contacts for these plans.

There may be project-specific studies that display flow information (hydropower projects being the most conspicuous example). Any environmental impact statement will examine potential impacts to water resources. Various entities may prepare Habitat Conservation Plans (HCPs) to fulfill ESA needs. HCPs can be done by private industry or government agencies. A limiting factors analysis done under the auspices of HB 2496 could contain flow information.

Special Cases in Flow Management

Cross-boundary Issues. If you are water planning in an area covered by more than one jurisdiction, talk with the jurisdictions in the other part of the area before making decisions or commitments. Upstream activities may influence downstream flows. Washington borders two other states (Oregon and Idaho), plus British Columbia, Canada. All these entities operate under laws that are different from Washington's. The U.S. Clean Water Act and the Endangered Species Act do not apply to Canada, although Canada has comparable approaches. Many rivers cross boundaries which makes for interesting inter-jurisdictional management – an extreme example is the Columbia and its tributaries, which is in British Columbia (Canada), Wyoming, Montana, Idaho, Nevada, Utah, and forms the border between Washington and Oregon.

Estuaries. Estuaries are obviously influenced by flows from their streams, but they are also influenced by tides. Special analysis is needed to deduce the relationships in all the flow-related components. A modified IFIM study has been done in the lower Skagit River that considers both flow from the river and tidal influence.

What are the stream flow needs in a watershed?

One way to look at the flow needs in a watershed is to look at needs based on past actions and anticipate the future. Look at physical, biological and economic/social parameters. Ch. 90.54 RCW <http://www.wa.gov/ecology/wr/rules/laws-wr.html> lists what are called the "beneficial uses" of water. WPUs can look at these uses and ascertain which need to be addressed in the planning area. The list of beneficial uses is: domestic, stock watering, industrial, commercial, agricultural, irrigation, hydroelectric power production, mining, fish and wildlife maintenance and enhancement, recreational, and thermal power production purposes, and preservation of environmental and

aesthetic values, and all other uses compatible with the enjoyment of the public waters of the state. The discussion following addresses how flows might relate to various uses in a general way.

A good way to start is with a scoping process. Scoping is a first step in watershed planning under Chapter 90.82 RCW after a planning process in initiated. This is the time to determine whether instream flows will need to be addressed in the assessment and the planning process, how information will be collected and analyzed, and who will do the technical work required to address stream flows. If instream flows have previously been established, the initiating governments must decide whether the existing flows will be reevaluated for possible amendment. Lead-time for work-planning is necessary if flow studies are needed. More than one watershed area may need flow studies. Such studies can generally only be conducted during certain parts of the year when flows are at appropriate levels and are relatively stable. Generally, for determining fish habitat, measurements need to be taken over a range of flows (generally at high, medium, and low flows). Ecology is researching numerous existing instream flow studies and is preparing a data base of them for use by WPUs and others.

Fish

Fish in danger of extinction need protection. Currently, listing of fish stocks under ESA is an important factor – particularly where there is a direct link between flows and the listed fish. Streams need to have enough water in them to avoid a "take" of listed fish under ESA. Further (and this concept will be discussed in more detail later), the National Marine Fisheries Service is requiring what they are calling "target" flows" which they believe are biologically achievable, based on science, are restorative for fish runs, and may be imposed on existing state-issued water rights. Federally mandated target flows are not based on state water law.

There are numerous documents with fish-flow and related information. One such document that gives much fish and flow information is the 1992 *Salmon and Steelhead Stock Inventory* (available on the DFW website - http://www.wa.gov/wdfw/recovery.htm), ESA listings and recovery documents from the federal agencies (websites listed in appendix) are sources of fish and flow information, as are Indian Tribes. While not basin specific, the Governor's Statewide Strategy for Recovery of Salmon suggests alternative strategies for protecting and restoring flows.

Water Quality

Water quality and flows are related. Section 303(d) of the Clean Water Act requires the listing of water bodies that do not meet water quality standards. Ecology listed 49 streams in 1998 under §303(d) because flows are inadequate to support designated instream water uses such as fish. These streams are generally expected to be addressed in the future through the establishment, protection and restoration of stream flows. The §303(d) list can be found on Ecology's website at http://www.wa.gov/ecology/wq/303d/.

Questions to be asked related to water quality and flows are: Are streams §303(d) listed due, in whole or in part, to low flows? Are there Total Maximum Daily Loads (TMDLs) – water clean-up plans - in your basin that have a low flow component? What would be the impact of reduced flows on concentrations of pollutants? Are there waste discharge permit holders open to buying water to increase flows and thereby increase loading capacity? The Water Quality Program in the Ecology regional offices can provide much information on these aspects for watershed planning.

Cultural and Aesthetic

Are there cultural or aesthetic values in your watershed that need attention? The needed amount of flow may be more subtle than having adequate water for fish or dilution capacity. Cultural and aesthetic values need to be considered. For example, Snoqualmie Falls is a sacred place to some native Americans. Flows over the Falls may need to be protected to protect religious rights. Scenic stream reaches may also require flows to retain aesthetic values.

Recreation

High flows may be required at some times of the year to provide recreational boating flows – *i.e.* kayaking and rafting. The National Park Service has prepared a publication describing concepts and research methods for assessing flows for recreation.[1]

POLICY CHOICES

The environmental effects of flow setting need to be analyzed. Many watershed units around the state involved in Ch. 90.82 RCW planning have indicated they want to recommend flows. Other planning groups may defer to Ecology for determining appropriate flow levels

Sidebar 2 - A HYPOTHETICAL EXAMPLE of Water Right Relationships

Farmers hold water rights for withdrawing water from a stream. Farmer Brown has a water right dated 1899 for three cfs. Farmer Jones has a water right from 1929, also for three cfs. Smith has one dated 1954 for five cfs. An instream flow rule was adopted in 1975 that would keep 75 cfs in the stream to protect instream values. Farmer Green has a 1982 water right for 10 cfs.

In wet years, when the stream flows are high, there is enough water to supply all the withdrawals and the instream flows.

3 cfs for Brown
3 cfs for Jones
5 cfs for Smith
75 cfs for the instream flow
10 cfs for Green.

But then in a dry year, there may not be enough water to satisfy all those with valid water rights. Brown gets his 3 cfs; then Jones gets hers, then Smith, then the minimum flow and then Green. Who gets water depends on their priority date – the date of their water right and the amount of water available. In water management jargon, Green's water right would be "junior" to all the others; and Brown's would be the most "senior". Whether or not Green would get his water would depend on the amount of water available in a given year or season (*i.e.* if it is a wet or a dry year).

The Current Situation

As mentioned previously, 17 of the 62 WRIAs have had flows established by rules. Many existing instream flows, currently adopted in state rules, were not designed or intended to be met at all times every year. Instream flows under state law are regarded as a water right under the prior appropriation doctrine. The prior appropriation doctrine is summarized in the statement "first in time is first in right". In terms of flow, what this means is that whomever first obtained a valid water right for the use of the water, has a higher priority for using that water than someone establishing a water right with a later date. If flows should diminish to a point where all holders of water rights could not be satisfied, the person with the oldest (most senior) water right would get water prior to those with a later water right date (a later "priority date").

Instream flows were established to protect instream resources, including fish. Fish take their turn

[1] Whittaker, D. et. al. 1993. *Instream Flows for Recreation: A Handbook on Concepts and Research Methods*. Available from the Alaska Region of the National Park Service; 2525 Gambel Street; Anchorage, AK 99503. 104 pp., illus.

under the water right priority system. Current law talks about preserving and protecting flows to protect instream resources.

If the stream flows in a river are mostly adequate to meet the needs of fish and other instream values, then the existing approach to setting instream flows will serve to preserve these existing stream flows for fish and other instream values in the future. Strategies to ensure that the instream flows are met can be designed and included in a watershed plan for that river. Instream flows established for rivers where existing stream flows are adequate to protect instream values have been referred to as "preservation flows."

The Watershed Planning Act requires watershed plans to include strategies to ensure sufficient water to meet instream flows. However, watershed planning units trying to identify these strategies are likely to find that existing state instream flows cannot be met with a high degree of certainty. Any new instream flows adopted under the existing state system would also be very difficult to meet on a constant basis.

Offstream water users with water rights that are senior to the instream flow rules are authorized to use water even when the instream flows are not being met. Even without water use, climate alone will cause variability in stream flows that do not meet the adopted instream flows in some years or seasons. When instream flows were adopted, it was recognized that these adopted flows would not be met every year.

Sidebar 3: Emphasis of Current Laws on Protection and Preservation

RCW 90.54.020

(3) The quality of the natural environment shall be ***protected*** and, where possible, **enhanced** as follows:

(a) Perennial rivers and streams of the state shall be retained with base flows necessary to provide for ***preservation*** of wildlife, fish, scenic, aesthetic and other environmental values, and navigational values. (***Emphasis added.)***

RCW 90.22.010

The department of ecology may establish minimum water flows or levels for streams, lakes or other public waters for the purposes of ***protecting*** fish, game, birds or other wildlife resources, or recreational or aesthetic values of said public waters whenever it appears to be in the public interest to establish the same. In addition, the department of ecology shall, when requested by the department of fish and wildlife to ***protect*** fish, game or other wildlife resources under the jurisdiction of the requesting state agency, or if the department of ecology finds it necessary to ***preserve*** water quality, establish such minimum flows or levels as are required to ***protect*** the resource or ***preserve*** the water quality described in the request or determination. (***Emphasis added.)***

This issue is also particularly important in basins with fish species listed as endangered or threatened. Where stream flows are limiting to the recovery of listed fish, the federal agencies responsible for the Endangered Species Act have emphasized the need to set instream flows that can be achieved with a high degree of certainty. They have also emphasized that instream flows need to be biologically-based and sufficient to

ensure recovery and survival of listed fish. The term "target flow" has been affiliated with ESA and other federal programs that are pursuing adequate stream flows for fish. Such flows are based on federal law rather than state law. However, there are strategies under state law that can help restore depressed or inadequate stream flows. These include water conservation, lease or purchase of water, enforcing illegal and excessive use, and water measurement requirements.

There may be authority, as yet untested, for the state to set restoration flows under the Water Resources Act of 1971 (Ch. 90.54 RCW). That statute says, in 020(3) "The quality of the natural environment shall be protected and, where possible, enhanced as follows: (a) Perennial rivers and streams of the state shall be retained with base flows necessary to provide for preservation of wildlife, fish, scenic, aesthetic and other environmental values, and navigational values. (Emphasis added.) This language seemingly allows Ecology to establish a restoration flow (goal) by rule.

The Governor's Statewide Strategy for Recovery of Salmon refers both to protection of existing stream flows where they are adequate to meet the needs of salmon, and restoration of stream flows where flows are not currently adequate. For rivers where the existing stream flows are not adequate to meet the needs of fish, a "preservation" flow would not be an effective approach. Rather, a "restoration" flow would be the primary objective for setting and achieving instream flows.

The obligation to meet instream flows through the watershed plan or to meet ESA requirements is compelling the state and watershed planning units to take a different approach to setting and achieving instream flows. If a river currently has enough water to meet instream needs, a traditional "preservation" instream flow may suffice. If a river does not currently have adequate stream flows, a "restoration" flow would need to be set; one that can be achieved.

Instream flow rules adopted as a result of watershed plans, or salmon recovery plans, could actually have two different flow rates - an instream flow for preservation purposes that is only achieved during wetter years and only affects junior water rights, and another instream flow that is expected to be met most of the time and for which strategies are in place to ensure they are achieved.

Water Vision

In a related action, the state has been developing a new concept for instream flows. The Governor sent a letter in early 2000 to the leadership of the state Legislature defining a preferred future for water resources management in Washington. Four concepts are described in the letter:

- Natural resource base
- A water market
- Information-based management
- Shared governance

Still under development, the draft "A Water Resources Vision – a preferred future for water resource management in Washington State" includes the above elements as cornerstones for moving forward with water management. < http://www.wa.gov/ecology/wr/plan/vis-stat.html >

The draft definition for the natural resource base is "adequate water quantity and quality to ensure a healthy, properly functioning watershed." This concept is closely related to the idea of stream flows that must be met with a high degree of certainty. Instream flows derived for this concept could vary from year to year to reflect weather and other natural conditions but would provide sufficient water to meet aesthetic, recreational and other needs, as well as biological requirements

on a watershed basis.

Part of the vision is to establish a water market where willing buyer and willing sellers of water can get together. This market could eventually replace the allocation and permit system and would be governed by rules to ensure equity and address any impairment. Basic family needs could be subsidized.

Information-based water management would hinge on monitoring of water conditions, including the measurement and reporting of water use. The information would be readily available for those in the water market. Water rights would be clearly defined and fully adjudicated. Development of this system will take time.

Washington is already moving in the "shared governance" direction – local governments are becoming increasingly involved in watershed planning and management and water rights, and would be involved in the water market. Water management responsibilities would be divided to those governments where administration and management would work best. The state would continue to oversee the natural resource base, in conjunction with tribal, federal and other state agency partners, but with substantial local involvement.

Watershed planning units are encouraged to have an early and in-depth discussion of the above ideas as they relate to instream flow and other needs in their watershed. These concepts are incorporated into the draft Water Resources Vision < http://www.wa.gov/ecology/wr/plan/vis-stat.html>.

How the Flow Setting Process Works

The roles of the planning groups and of Ecology for flow setting are described in Chapter 90.82.080 RCW. Planning unit and Ecology responsibilities vary depending on the specific circumstances, but basically the WPUs and Ecology work together to develop flows and then Ecology undertakes rule making to adopt flow rules.

When Ecology proposes a rule, there are specific steps it goes through. (There is a link to the Ecology's Rules Unit at http://www.wa.gov/ecology/leg/laws-etc.html describing Ecology's process and a link from there to the Code Reviser's Office, which describes the legal basis and procedures.) Simply put, Ecology would take the flows recommended by the planning group, and file a Preproposal Statement of Inquiry (CR-101). This notice says, in effect, that a rule making proposal is being contemplated. Rule language and supporting documentation would then be developed, including environmental and economic analyses. Entities with an interest would be consulted (much of this would probably have already occurred during watershed planning).
In areas not involved in watershed planning, Ecology would hold public workshops on instream flows and could establish a public advisory committee. Consultations with fisheries agencies and tribes on technical issues would be held.

Filing a Notice of Proposed Rule Making (CR-102) is the next step. This filing starts the rule promulgation clock. (The agency has 180 days to adopt, withdraw or extend the rule proposal.) This notice is followed by a public review and comment time – workshops and hearings are held and an explanation is compiled of what the public said about the proposal. Agency management would be briefed and the environmental analysis and rule language finalized.

After the public has commented and the analysis is completed, the Director of Ecology would then decide whether or not to issue the Rule Making Order (CR-103). The rule order includes a date when the rule goes into effect and it is published in the *State Register*.

If issues are raised during the public comment period of Ecology's rule making; Ecology will go back to the watershed planning group for consultation.

State agencies besides Ecology may be involved in the watershed planning process. The relationships are described in the state agency MOU[2] on watershed planning. (See the following website for information on the MOU between state agencies for Watershed Planning: http://www.wa.gov/ecology/watershed/MOU.html.) Generally, the Department of Fish and Wildlife will be heavily involved in determining and recommending flows since Chapter 90.22 RCW says the Department of Fish and Wildlife may request Ecology to set flows to protect fish, game and other wildlife resources.

The state Departments of Health, and Community, Trade and Economic Development may be involved in watershed planning, particularly if there are issues related to economic development and water supply (as well as others). The Interagency Committee for Outdoor Recreation (IAC) may be involved due to their role as administrators of the Salmon Recovery Funding Board. The Department of Natural Resources may have an interest in flows depending on the specific situation.

Several Ecology programs could be involved with instream flows, depending on the circumstances. Following is a thumbnail sketch of potential interest from Ecology programs regarding instream flows. Instream flows rules are developed by Ecology's Water Resources Program. Besides rule making, Water Resources would be interested in ground and surface water management, water rights administration, and dam safety, among others. The Water Quality Program would be interested in water quality issues. The Environmental Investigations Program would be interested monitoring and studies. The Shorelands and Environmental Assessment program would be involved in shorelines and wetlands issues, watershed management, and State Environmental Policy Act compliance.

Assistance

Instream flow information is available through the web at Ecology's Water Resources webpage <http://www.wa.gov/ecology/wr/wrhome.html>. Through the Ecology watershed lead, information is available on the policy and technical aspects of flow setting. Policy assistance would include such things as an overview of flows, what the laws say, how flows are administered in Washington, how to turn flow recommendations into rules, etc. Technical assistance could cover such things as what studies are needed, what studies have been done in a particular watershed, analysis and interpretation of data and studies; description of what studies would be appropriate under what conditions, and how to make the most of funds as applied to flow studies and information gathering.

[2] Memorandum of Understanding For the Coordinated Implementation of Chapter 247, Laws of 1998: Watershed Management (Engrossed Substitute House Bill 2514), and Chapter 246, Laws of 1998: Salmon Recovery Planning (Engrossed Substitute House Bill 2496), By the Participating Agencies Of the State of Washington: The Department of Agriculture, The Conservation Commission, The Department of Community, Trade, and Economic Development, The Department of Ecology, The Department of Fish and Wildlife, The Department of Health, The Department of Natural Resources, The Department of Transportation, The Interagency Committee for Outdoor Recreation, The Puget Sound Water Quality Action Team, The Salmon Recovery Office, Within the Governor's Office, and, The State Parks and Recreation Commission,

The watershed lead can arrange for Ecology staff specialists on instream flows to advise and assist watershed planning units and other watershed groups.